Printed Pages:03 **Sub Code: RCE 502**

Paper Id: 100502 **Roll No.** | | | | | | | | | | |

B. TECH.
(SEM V) THEORY EXAMINATION 2018-19
DESIGN OF STRUCTURE-I

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

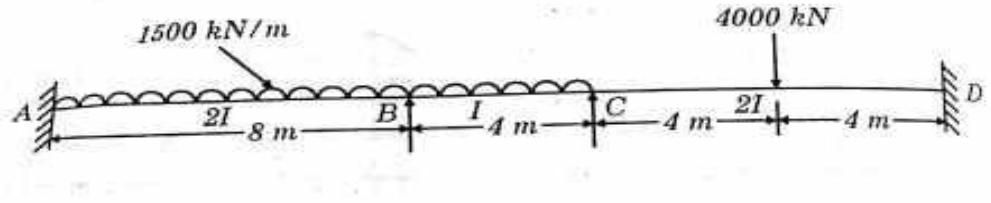
1. Attempt *all* questions in brief. 2 x 7 = 14

a. What do you mean by degree of redundancy?
b. Write the assumptions are made while developing slope deflection method.
c. What is the effect of temperature change in the cable?
d. Write different approaches to matrix method.
e. What is restrained structure?
f. Differentiate between plastic modulus and section modulus.
g. Write the limitations of load factor concept.

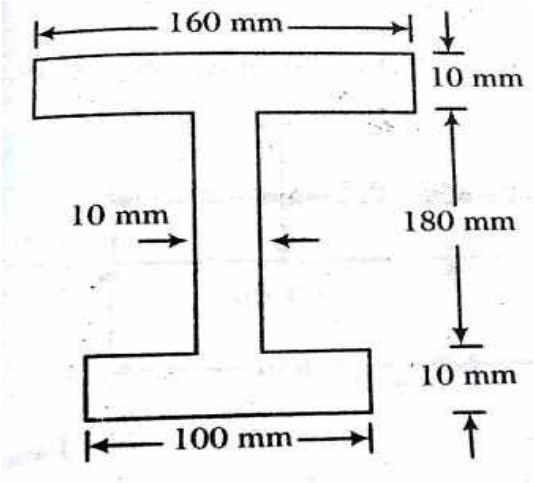
SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. A continuous beam ABCD is loaded as shown in figure. During loading support B sinks by 1 cm. Determine the support moments. Take I = 1600 cm^4; E = 2 x 10^5 N/mm^2. Use moment distribution method.



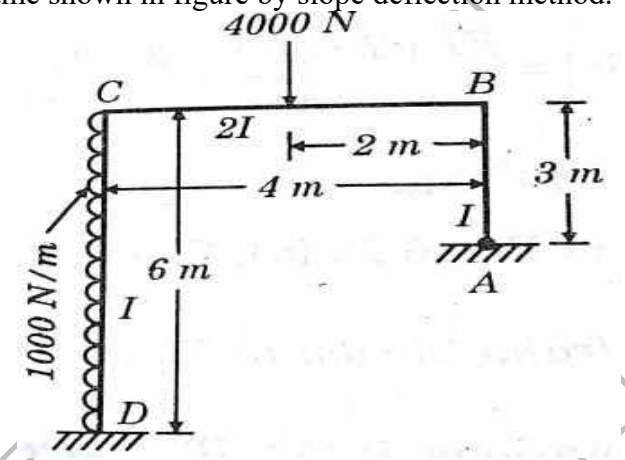
b. A two hinged semicircular arch of radius R carries a concentrated load W at the crown. Find the vertical deflection of the crown. Assume uniform flexural rigidity.
c. The three hinged girder of a suspension bridge have a span of 200 m, the dip of the supporting cable being 16 m. If the girder is subjected to two point loads 450 KN and 280 KN at distances of 40 m and 150 m from the left end. Find the S.F. and B.M. for the girder at 75 m from the left end. Find also the maximum tension in the cable. Draw the bending moment diagram for the girder.
d. What is stiffness matrix? Give the step of flexibility matrix method for analysis of indeterminate beam.
e. Find the shape factor of the I- section shown in figure:



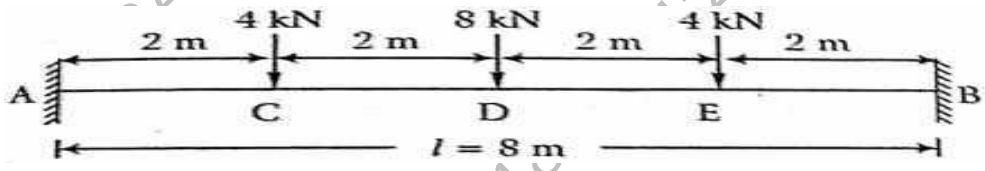
SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) Analyse the frame shown in figure by slope deflection method.



(b) Analyse the fixed beam shown in figure using strain energy method. And draw the B.M.D.



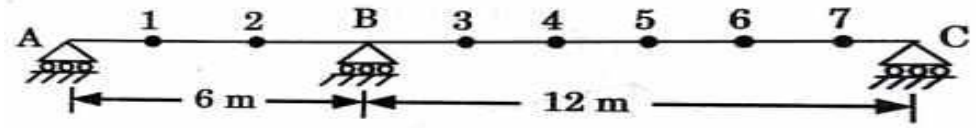
4. Attempt any *one* part of the following: 7 x 1 = 7

(a) A two hinged parabolic arch has span of 20 m and a rise 5 m carries a UDL of 20 KN/m for a distance of 5 m from the left end. Determine,

i. The horizontal thrust at each support

ii. Bending moment, normal thrust and radial shear at a section of the arch 5m from the left end.

(b) Using Muller Breslau Principle, compute the influence line obtained at 2 m intervals for reaction at C of the continuous beam ABC shown in figure below:



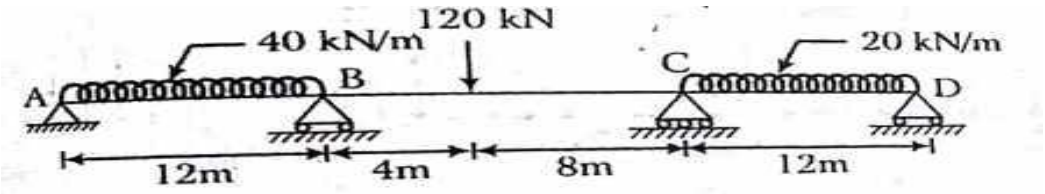
5. Attempt any *one* part of the following: 7 x 1 = 7

(a) A suspension bridge has a cable of span 100 m and dip of 10 m. The cable is stiffened by a three hinged stiffening girder. Sketch the influence line diagram for bending moment at quarter span of girder. Determine the maximum moment at this section when a UDL longer than the span of intensity 10 KN/m traverses the span.

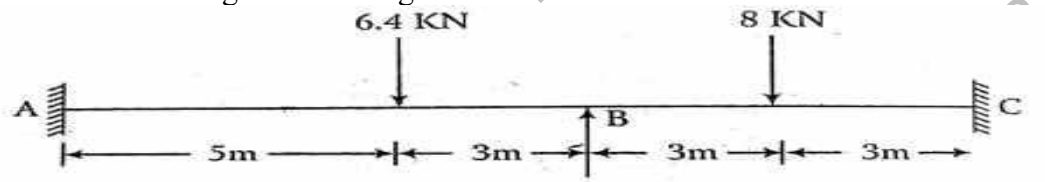
(b) A suspension bridge of span 100 m and width 6 m is having two cables stiffened with two hinged girders. The central dip of cable is 10 m. The dead load on the bridge is 10 KN/m^2 and live load is 20 KN/m^2 which covers the left half of the span. Determine the shear force and bending moment at 25 m from the left end. Find also the maximum tension in the cable.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Analyse the continuous beam shown in figure by flexibility matrix method. Take EI is constant.

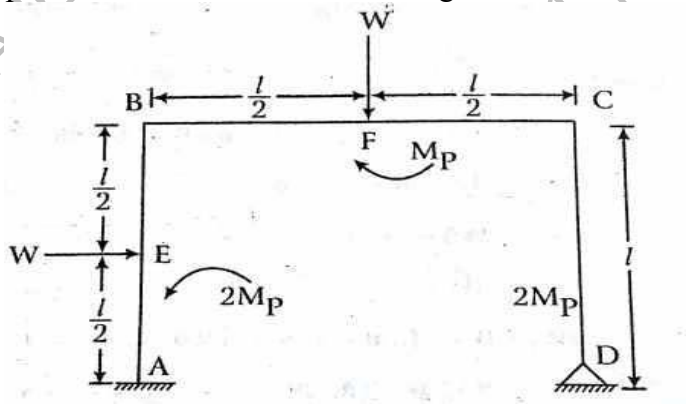


(b) Analyse the continuous beam shown in figure by stiffness matrix method. Also sketch the bending moment diagram.



7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Find the collapse load for the frame shown in figure.



(b) Analyse the propped cantilever beam loaded as shown in figure and determine the collapse load.